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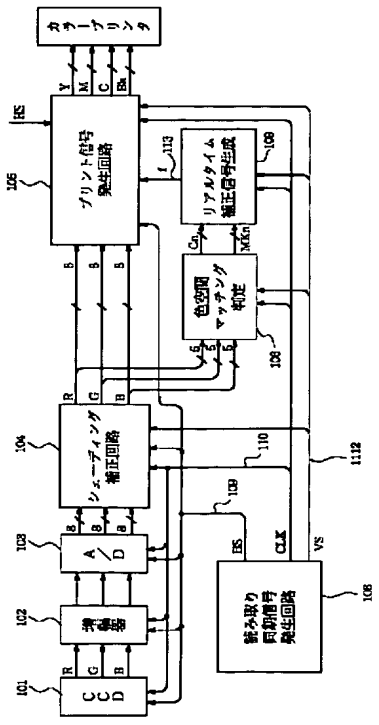
(54)【発明の名称】　画像処理装置

(57)【要約】

【目的】　入力画像と特定画像との、類似度に応じて、入力画像を処理する。

【構成】　入力画像と特定画像との類似度を判定する手段（１０６）を有する画像処理装置であって、前記入力画像の所定の領域毎に、特定画像との類似度を判定することを特徴とする。



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【特許請求の範囲】

【請求項１】　入力画像と特定画像との類似度を判定する手段を有する画像処理装置であって、前記入力画像の所定の領域毎に、特定画像との類似度を判定することを特徴とする画像処理装置。

【請求項２】　前記判定手段は、入力画像と特定画像の色味の分布に応じて類似度を判定することを、特徴とする請求項１記載の画像処理装置。

【請求項３】　前記特定画像は、複数の画像であることを特徴とする請求項１記載の画像処理装置。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は、特定画像の検出を、入力画像信号に基づいて行う画像処理装置に関するものである。

【０００２】

【従来の技術】近年、複写機の発達に伴って、読み取った原稿の再現性が向上している。このため、紙幣などの偽造行為を防げるための技術が必要となる。その技術のひとつとして、色空間での特定原稿データを予め登録し、入力原画像データの分布が、色空間上で、特定原稿データの分布と、ほぼ同一になるか否かを判定し、特定原稿を判別する技術が本出願人により提案されている。

【０００３】さらに詳しくは、入力原画像データのＲ（レッド）、Ｇ（グリーン）、Ｂ（ブルー）信号のＲ、Ｇ、Ｂ３次元座標空間での分布と、特定原稿データのＲ、Ｇ、Ｂ３次元座標空間での分布を比較し、合致している部分がある一定値以上になった場合、特定原稿の画像データが入力されていると判断するものである。

【０００４】

【発明が解決しようとしている課題】しかしながら、上記技術によると、例えば図１８に示すように、入力原稿の面積が大きく、かつ、特定原稿の色味に似た部分が、散在している場合、入力原稿を誤って特定原稿と誤判定するという問題がある。

【０００５】これは、特定原稿に対して、判定対象となる入力原稿の面積が相対的に大きくなるにつれて顕著になる。

【０００６】そこで、本発明は入力画像の所定の領域毎に、上記判定を行うことにより、誤判定を防止した画像処理装置を提供することを目的とする。

【０００７】

【課題を解決するための手段及び作用】上記課題を解決するため、本発明の画像処理装置は、入力画像と特定画像との類似度を判定する手段を有する画像処理装置であって、前記入力画像の所定の領域毎に、特定画像との類似度を判定することを特徴とする。

【０００８】

【実施例】以下、実施例で本発明の実施例を説明する。

【０００９】（信号処理ブロック図）図１は、カラー画像読み取り装置の信号処理ブロック図である。

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【００１０】同図において、１０１はＣＣＤカラーセンサーであり、１０２は、アナログ増幅器であり、１０３はＡ／Ｄ変換器であり、１０４は、画像信号の読み取り位置による、明るさのばらつきを補正するシェーディング補正回路である。

【００１１】１０６は読み取り画像データと例えば紙幣、有価証券等の特定原稿との３次元色空間での分布の類似度をリアルタイムで算出する色空間マッチング判定回路である。

【００１２】シェーディング補正後のカラー信号を用いることにより、原稿の位置による、明るさ、色味の歪みが補正され、入力原稿の置かれる位置にかかわらず、色空間での類似度判定を正確に行うことができる。

【００１３】カラー画像読み取り装置のシェーディング補正回路１０４は、公知の技術のため、ここでは詳述しない。

【００１４】１０５は、プリント信号生成回路であり、入力カラー信号Ｒ（レッド）、Ｇ（グリーン）、Ｂ（ブルー）をＹ（イエロー）、Ｍ（マゼンダ）、Ｃ（シアン）、Ｂｋ（ブラック）信号に変換する回路である。また、リアルタイム補正信号ｆ１１３により、プリント信号を変調する。

【００１５】１０７は、リアルタイム補正信号ｆ１１３を生成する回路である。

【００１６】１０８は、読み取り同期信号ＩＩＳ１０９、ＣＬＫ１１０、ＶＳ１１２を生成する回路ブロックである。ＩＩＳ１０９は、主走査区間信号であり、ＣＬＫ１１０は画素読み取り基本クロック信号であり、ＶＳ１１２は、原稿読み取りの副走査方向有効領域を示す区間信号である。

【００１７】（色空間マッチング判定回路ブロック１０６）図２は、色空間マッチング判定１０６を説明する図面である。

【００１８】同図において、Ｒ２０１はシューディング補正回路１０４からのＲ（レッド）信号８ビットのうちの上位５ビットのデータである。同様に、Ｇ２０２は５ビットのＧ（グリーン）信号であり、Ｂ２０３は５ビットのＢ（ブルー）信号である。

【００１９】２０４は、複数種類の特定原稿の色味に関する情報が格納されているＲＯＭ（リードオンリメモリ）である。アドレス$A_0$～$A_{14}$に前記Ｒ、Ｇ、Ｂ信号が入力され、入力Ｒ、Ｇ、Ｂ信号が、複数種類の特定原稿のそれぞれの色味に合致しているか否かを示す、判定信号が、データ$D_0$～$D_7$に出力される。

【００２０】ＲＯＭ２０４のデータには図９に示す様に、特定原稿の色味に関する情報が格納されており、特定原稿の色味に合致する場合は１が、そうでない場合は０が、$D_0$～$D_7$のそれぞれに出力される。$D_0$～$D_7$は、第０から第７までの８種類の特定原稿に対応する。

【００２１】図１３は、ＲＯＭ２０４に格納されている複数原稿の色味に関するデータと、ＲＯＭ２４のビット位置との関係を示した図である。これにより、入力された画素データに対して$D_0$～$D_7$から、８種類の異なった特定原稿の色味に関する判定情報が、並列に出力される。

【００２２】２２０～２２７は、色味判定信号$X_0$２１０～$X_7$２１７の信号を用いて、図７、及び図８で示す平滑演算を行う回路である。

【００２３】図７は平滑回路２２０～２２７の回路構成を示す回路ブロック図である。

【００２４】同図において、７０１、７０２は乗算器、７０３は加算器、７０４はラッチ回路、７０５はコンパレータである。乗算器７０１、７０２、加算器７０３による入力データと前データとの加重平均により、下の図８に示す様な、連続性を加味した判定が可能となる。

【００２５】図８は、入力Ｘｉと、平滑演算値Ｙｉとの関係を示す図である。入力Ｘｉの値が、１が連続すればＹｉの値が増大する。

【００２６】これにより、入力Ｒ、Ｇ、Ｂ信号が、連続して特定原稿の色味に合致している場合に、信号２３０～２３７が１となり、ノイズ等の影響を受けることなく、より正確な判定が可能となる。

$$\delta n = \frac{l}{100} \times U_{ORG}$$

ここで、$U_{ORG}$は図１４においてＲ、Ｇ、Ｂ座標軸を３２区分した、立方体を単位体積とする数値である。

【００３３】ｌの値は、特定原稿が、原稿台に置かれている場合、約半分まで読み取った時、判定信号ＭＫｎが１となる様、設定する。

【００３４】ＣＣＬ２８１は、色空間マッチング処理を

$$ls \geq lm \geq \frac{ls}{2}$$

ｌｓ：特定原稿の長手方向のサイズ

ｌｍ：ＣＣＬ２８１が１である区間距離

【００３６】セレクタ２７１、２７２は、副走査区間信号ＶＳ１１２が０（ＬＯＷ）のとき、または、色空間マッチング処理領域信号２８１が０（ＬＯＷ）のとき、ＳＲＡＭ２０９を０にクリアするためのものである。アドレスジェネレータ２７０は、ＳＲＡＭ２０９のすべてのアドレスを順々に発生する回路である。ＶＳＣＬ２８０がＬＯＷの時、アドレスジェネレータ２７０が発生するアドレス信号に従ってＳＲＡＭ２０９が０にクリアされる。

【００３７】２０５は、図４に示す、タイミング信号を発生するタイミング発生回路である。

【００３８】ＣＬＫ４　２０６は、基本クロックＣＬＫ１１０を４分周した、クロック信号であり、２０７は、ＳＲＡＭ２０９のライトイネーブル端子を制御する信号であり、２０８はＳＲＡＭ２０９のアウトプットイネーブル端子を制御する信号である。



【００２７】色空間判定回路２４０～２４７において、図１４に示すＲ、Ｇ、Ｂ色空間における、特定画像データと入力カラー信号の類似度をリアルタイムで算出し、色空間類似度判定信号$MK_0$２６０～$MK_7$２６７を算出する。

【００２８】図３は、色空間判定回路２４０～２４７の内１つの回路ブロック図である。

【００２９】本回路構成により、ＳＲＡＭ２０９からのデータＤｎと、平滑回路からの信号Ｃｎと、ＯＲ演算され、ＳＲＡＭ２０９に書き込まれる。また、データＤｎが０から１に遷移する場合のみ、カウンタ３０１がカウントアップされる。カウンタ３０１は、副走査区間信号ＶＳ１１２の立ち上がり、または、ＣＣＬ２８１のロー区間でクリアされる。

【００３０】回路ブロック３１０は、カウンタ３０１の出力値の最大値をラッチする回路である。

【００３１】カウンタ３０１の出力最大値Ｚｎとレジスタ３０２の定数δｎとがコンパレータ３０２で大小比較され、Ｚｎ＞δｎの場合、ＭＫｎ＝１となり、Ｚｎ≦δｎの場合、ＭＫｎ＝０となる。δｎの値は、図１４の$U_{ORG}$の１％の値が設定されている。

【００３２】

【外１】

… (1)

行う領域を示す信号であり、図１５に示すタイミングで、下記（２）式を満足する様にタイミング発生回路２０５により発生される。

【００３５】

【外２】

… (2)

ブル端子を制御する信号である。

【００３９】上記処理により、一定区間領域の観測画像データすなわち、一定区間領域内の入力カラー信号列のデータが、特定原稿の画像データとＲ、Ｇ、Ｂ３次元色空間で、ほぼ同一の形状となった時、色空間類似度判定信号$MK_0$２６０～$MK_7$２６７が１に設定される。

【００４０】（リアルタイム補正信号生成）図５は、リアルタイム補正信号生成回路１０７を説明する、回路ブロック図である。

【００４１】本回路構成により、ＲＯＭ２０４に登録した複数の特定原稿データのうち、いずれか１つでも、観測画像データと色空間上で合致したと判定される時、リアルタイム補正信号ｆ１１３は１（ＨＩＧＨ）に設定される。

【００４２】（プリント信号生成回路）図６は、プリント信号生成回路１０５を説明する、回路ブロック図である。

【００４３】マスキングＵＣＲ演算回路Ａ６０１は、通常時、入力ＲＧＢ信号より、プリントＹＭＣＢｋ信号を生成する回路である。

【００４４】マスキングＵＣＲ演算回路Ｂ６０２は、入力カラー信号が特定原稿に合致すると判定された場合、色味を変えた、（例えば、赤みを強く）プリントＹＭＣＢｋ信号を生成する回路である。

【００４５】セレクタ６０３で、リアルタイム補正信号ｆ１１３により、回路６０１、６０２の信号を選択して出力することにより、特定原稿に合致していると判定された領域のみ、色味を変えてプリントすることが可能となる。

【００４６】（他の実施例）図２０、図２１は本発明の第２の実施例を説明するための図面である。

【００４７】前記第１の実施例は、一定区間領域毎に、入力原稿と、特定原稿の色分布の類似度を算出するものであった。色分布の類似度の算出値が一定間隔（図１５の斜線の区間）で、一旦クリアされるため、特定原稿の置かれている位置によっては、特定原稿検出がうまく行かない可能性がある。

【００４８】本第２の実施例においては、上述と同様の構成の２つの判定回路部２００１、２００２を設け、図２１で示す様に、位相の異なる、信号２１０１（ＣＣＬ１）、２１０２（ＣＣＬ２）により、それぞれの判定回路で、色空間マッチング判定を行うことにより、特定原稿の原稿台上の位置にかかわらず、より正確に特定原稿検出を行うものである。

【００４９】本実施例によれば、複数の回路を、異なる位相で働かせるので、簡単な信号制御で、正確な判定が可能となる。

【００５０】なお、上記実施例では、副走査方向で領域分割を行う様に、判定データのリセットを行ったが、例えば、コンピュータのソフトウェアにより判定する場合には、例えば、主走査方向に領域分割を行ってもよく、領域の分割の方法は、上述の例に限らない。

【００５１】

【発明の効果】以上説明した様に、入力画像の区分された領域毎に、特定画像との類似度を判定することにより、より正確に、特定画像の検出を行うことが可能となる。

【図面の簡単な説明】

【図１】カラー画像読み取り装置の信号処理ブロック図。

【図２】色空間マッチング判定１０６を説明する図面。

【図３】色空間判定回路２４０～２４７を説明する図面。

【図４】ＳＲＡＭ２０９へのデータ読み取り、書き込みに関するタイミングチャート。

【図５】リアルタイム補正信号生成回路１０７を説明する回路ブロック図。

【図６】プリント信号生成回路１０５を説明する回路ブロック図。

【図７】平滑回路２２０～２２７の回路構成を示すブロック図。

【図８】入力Ｘｉと平滑演算値Ｙｉとの関係を示す図。

【図９】特定原稿の色空間における形状と判定ＲＯＭ２０４の関係を示した図。

【図１０】原稿台上の特定原稿の位置と認識領域の関係を示した図。

【図１１】特定原稿ＡのＲ、Ｇ、Ｂ３次元色空間での分布を示した図。

【図１２】特定原稿ＢのＲ、Ｇ、Ｂ３次元色空間での分布を示した図。

【図１３】特定原稿Ａ～Ｈの色味情報が格納されたＲＯＭ２０４の、データ構成を説明した図。

【図１４】特定画像データと入力画像データとの比較を概念的に示した図。

【図１５】色空間マッチング処理領域信号ＣＣＬ２８１と、原稿台上の区分された領域との関係を示した図。

【図１６】色空間判定回路２４０～２４７を説明する図。

【図１７】色空間マッチング判定１０６を説明する図。

【図１８】入力原稿の色分布を示した図。

【図１９】第１の実施例で区分される入力領域を示した図。

【図２０】第２の実施例の色空間マッチング判定１０６を説明する図。

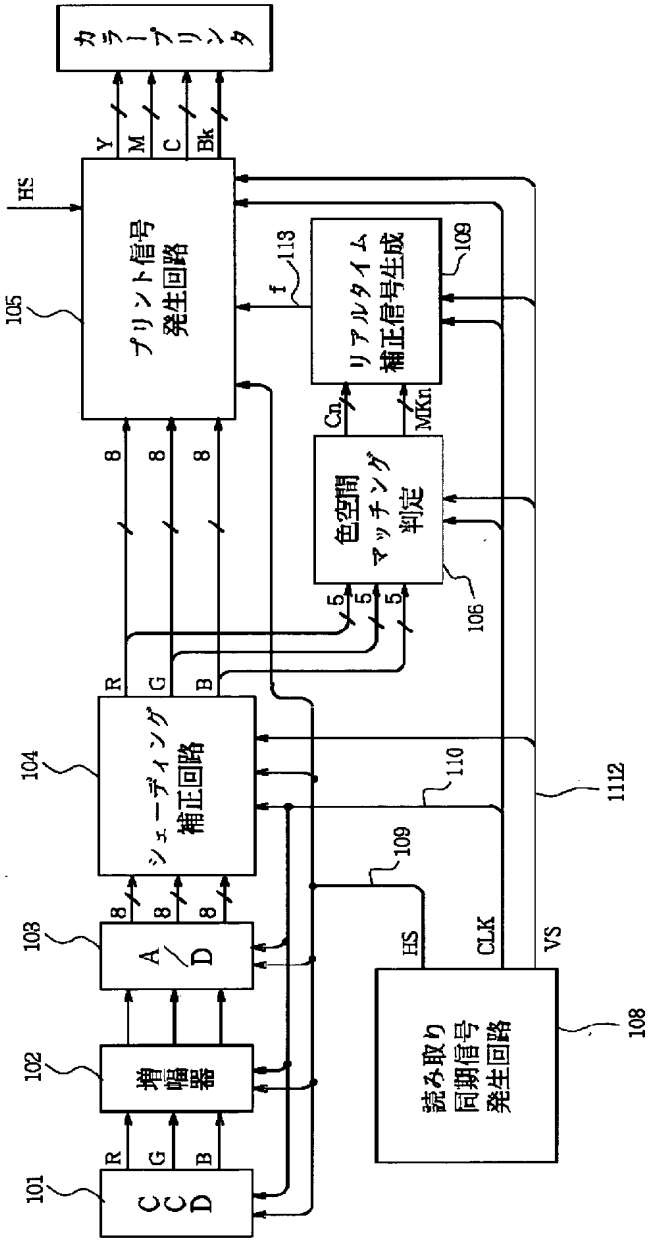
【図２１】第２の実施例での区分される領域を説明した図。

【符号の説明】

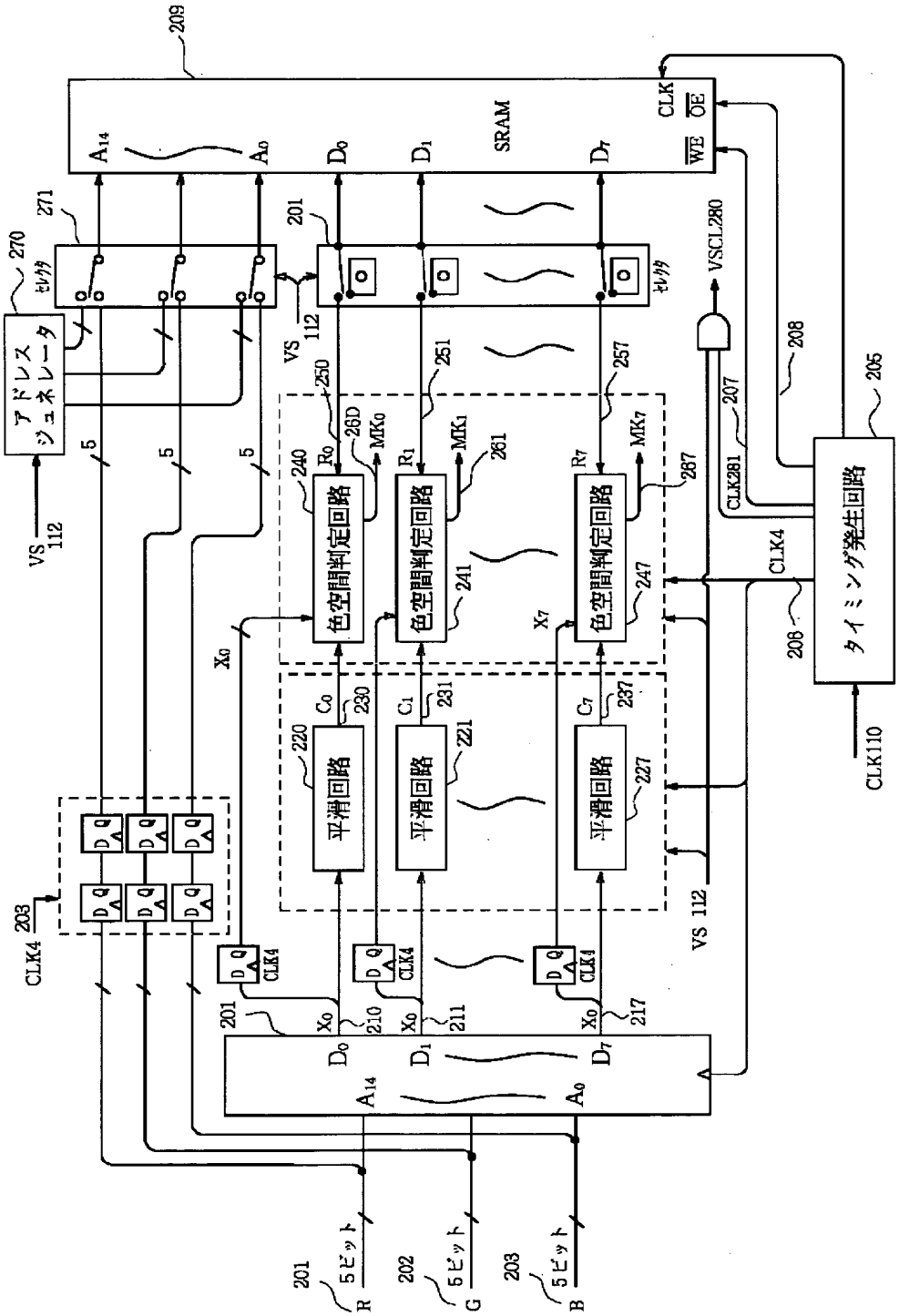
１０６　色空間マッチング判定回路

１０７　リアルタイム補正信号生成回路

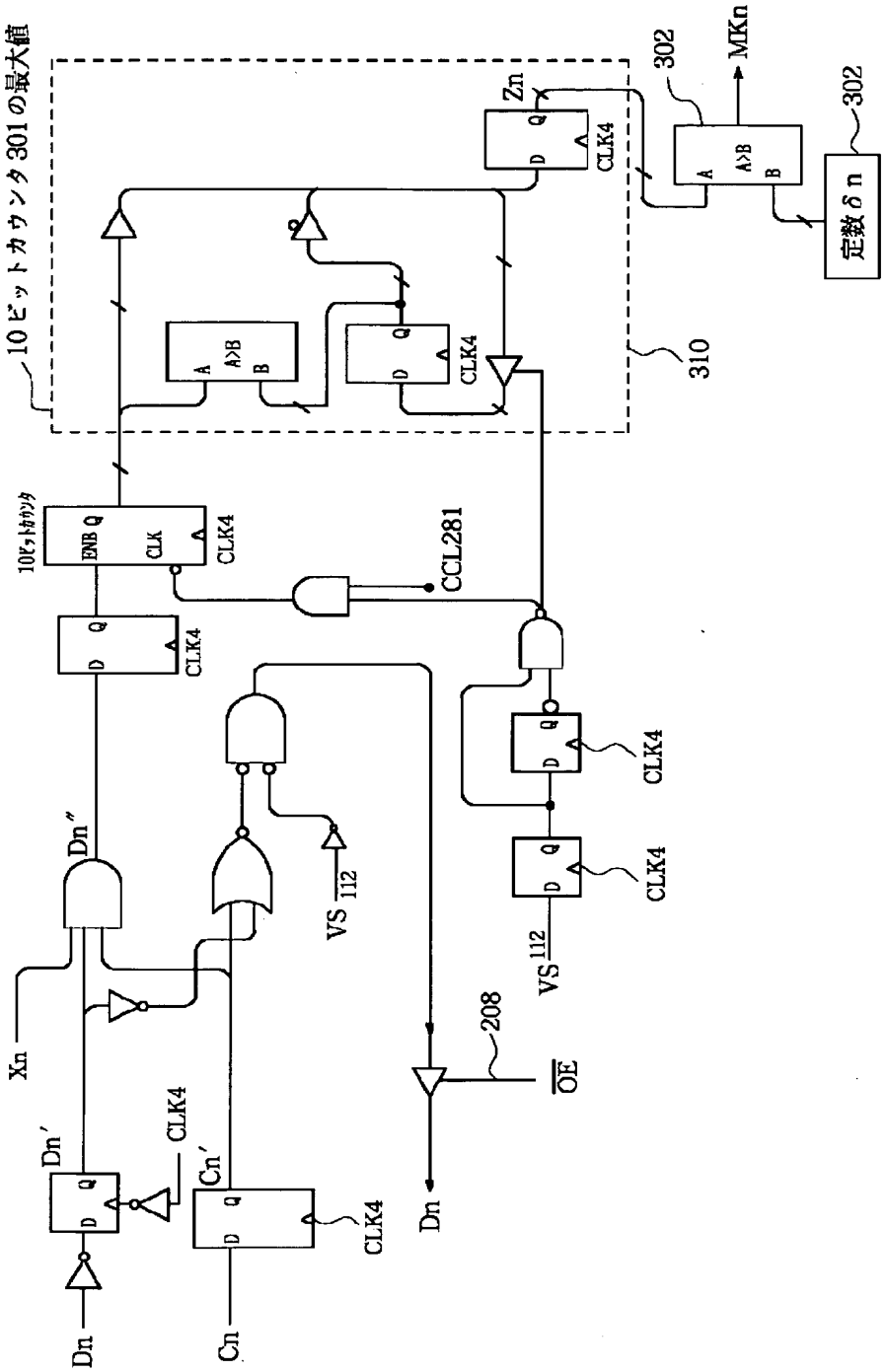
【図１】


カラープリンタ
Y
M
C
Bk
HS
プリント信号発生回路
105
f
113
リアルタイム補正信号生成
109
Cn
MKn
色空間マッチング判定
106
8
5
R
G
B
シェーディング補正回路
104
110
1112
A
D
108
102
増幅器
101
CCD
HS
CLK
VS
読み取り同期信号発生回路
108

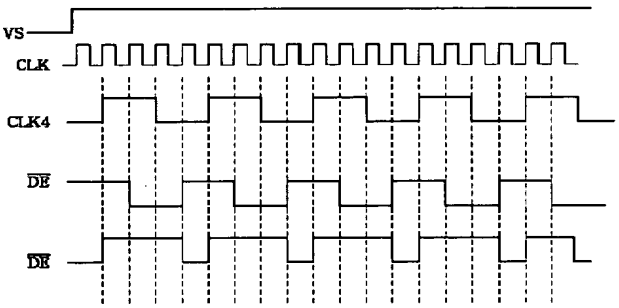
【図２】

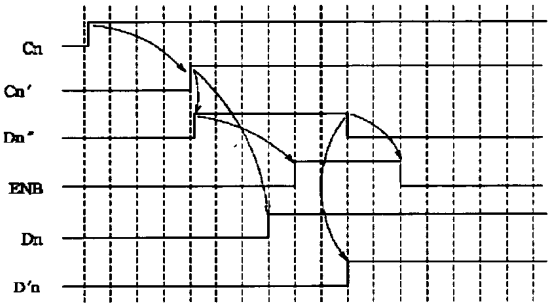

209
SRAM
CLK
WE
OE
A14
A0
D0
D1
D7
271
270
セレクタ
201
VS
112
アドレス ジェネレータ
5
250
251
257
240
241
247
220
221
227
色空間判定回路
平滑回路
R0
R1
R7
MK0
MK1
MK7
261
287
C0
C1
C7
230
231
237
X0
X7
VSCL280
208
207
CLK281
205
CLK4
206
タイミング発生回路
CLK110
203
CLK4
D Q
210
211
217
5ビット
R
G
B

【図３】

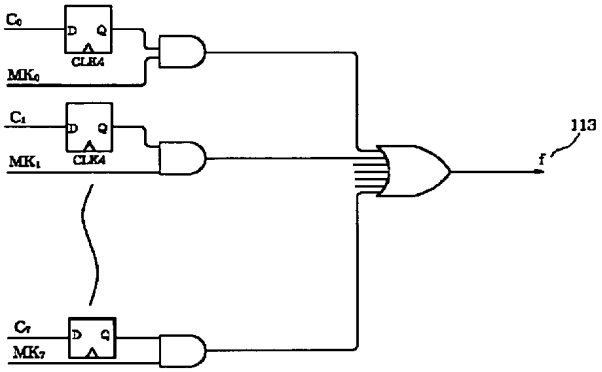

10ビットカウンタ301の最大値
Zn
CLK4
302
MKn
A>B
定数δn
310
CCL281
Dn″
VS 112
Xn
208
OE
Dn′
Cn′
Dn
Cn

【図４】

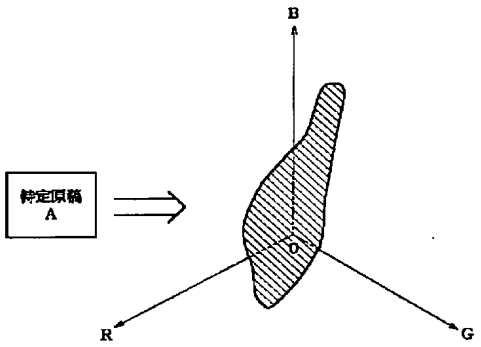


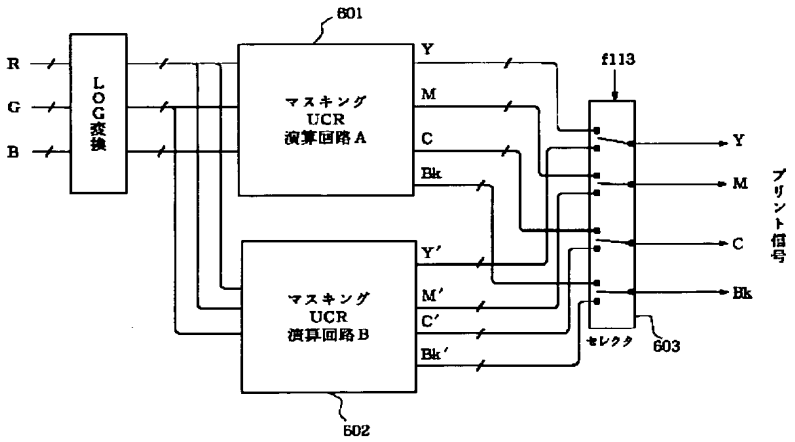

【図５】



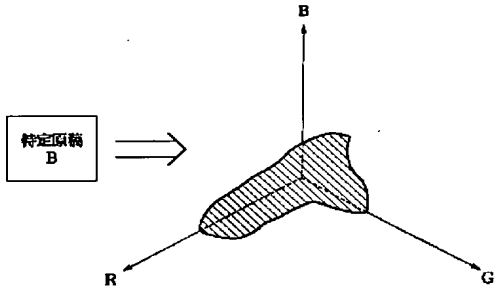

【図１１】



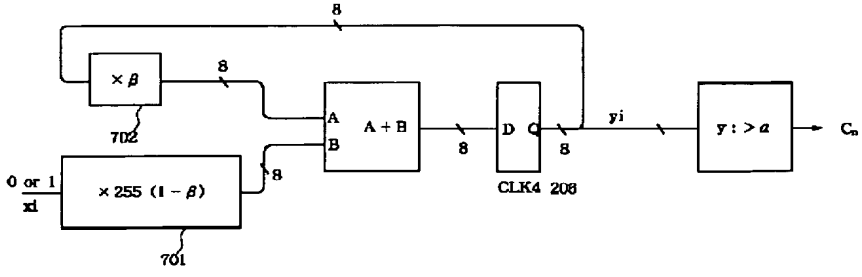

【図６】



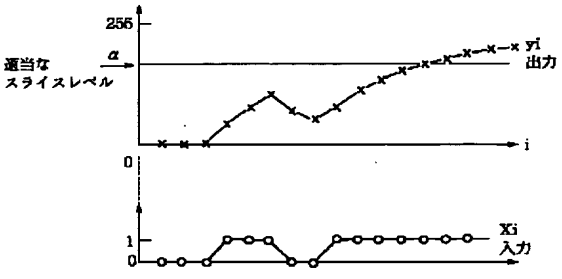

【図１２】



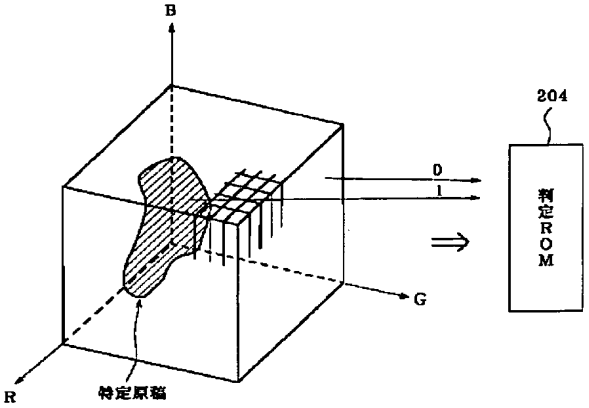

【図７】



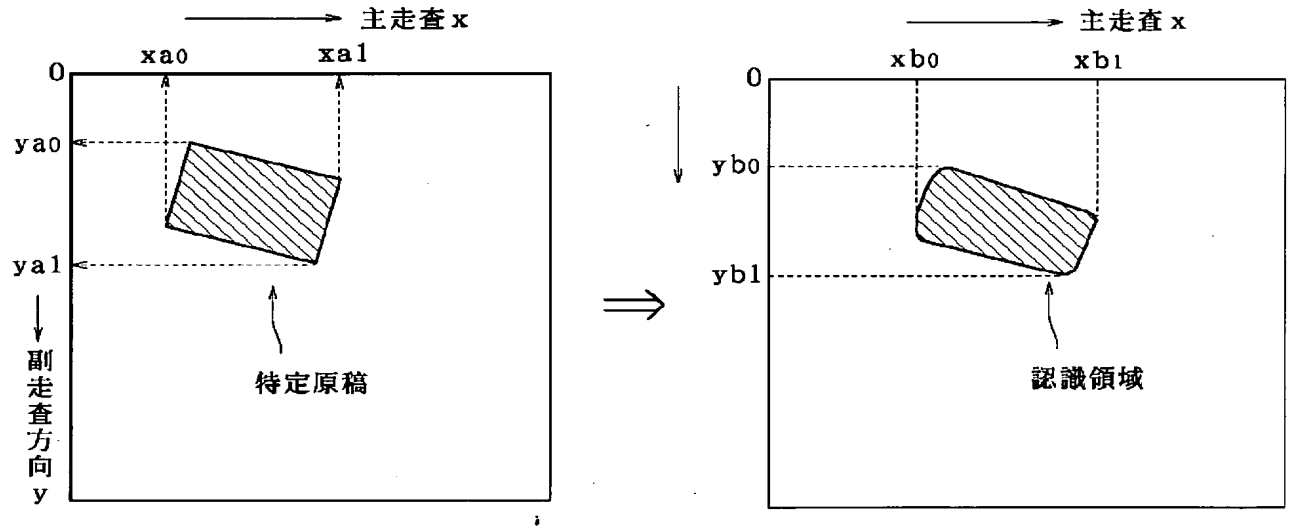
【図８】


255
適当な
スライスレベル
α
yi
出力
i
0
1
0
Xi
入力

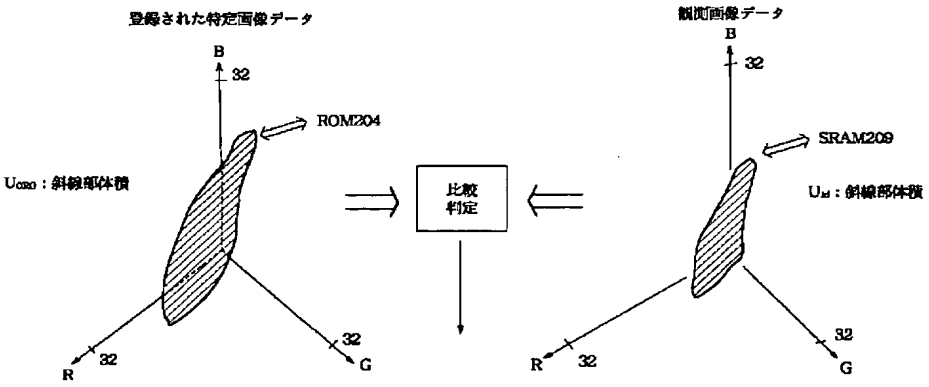
【図９】


B
204
判定ROM
0
1
G
R
特定原稿

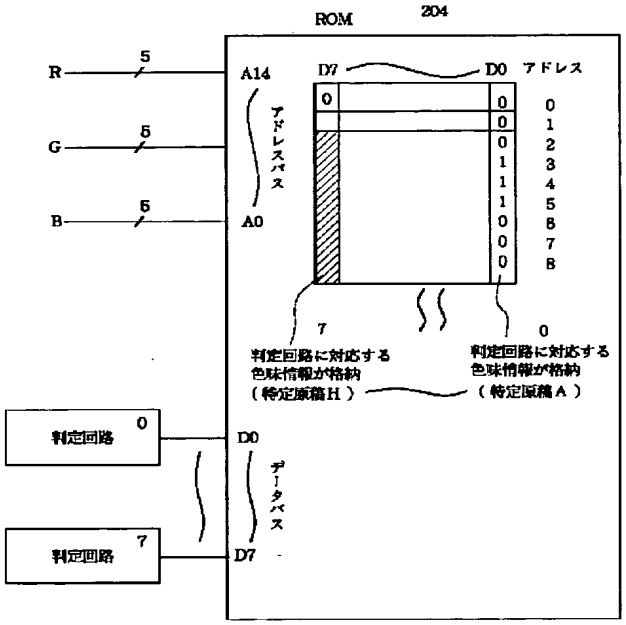
【図１０】


主走査x
xa0
xa1
0
ya0
ya1
副走査方向y
特定原稿
主走査x
xb0
xb1
0
yb0
yb1
認識領域

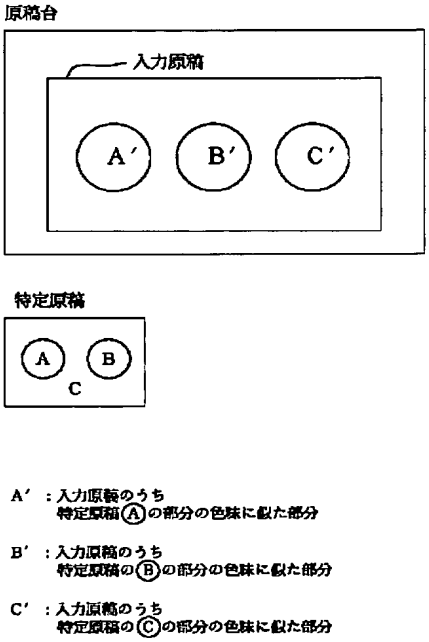
【図１４】


登録された特定画像データ
B
32
ROM204
Ucmo：斜線部体積
比較
判定
32
32
R
G
観測画像データ
B
32
SRAM209
Um：斜線部体積
32
32
R
G

【図１３】




【図１８】

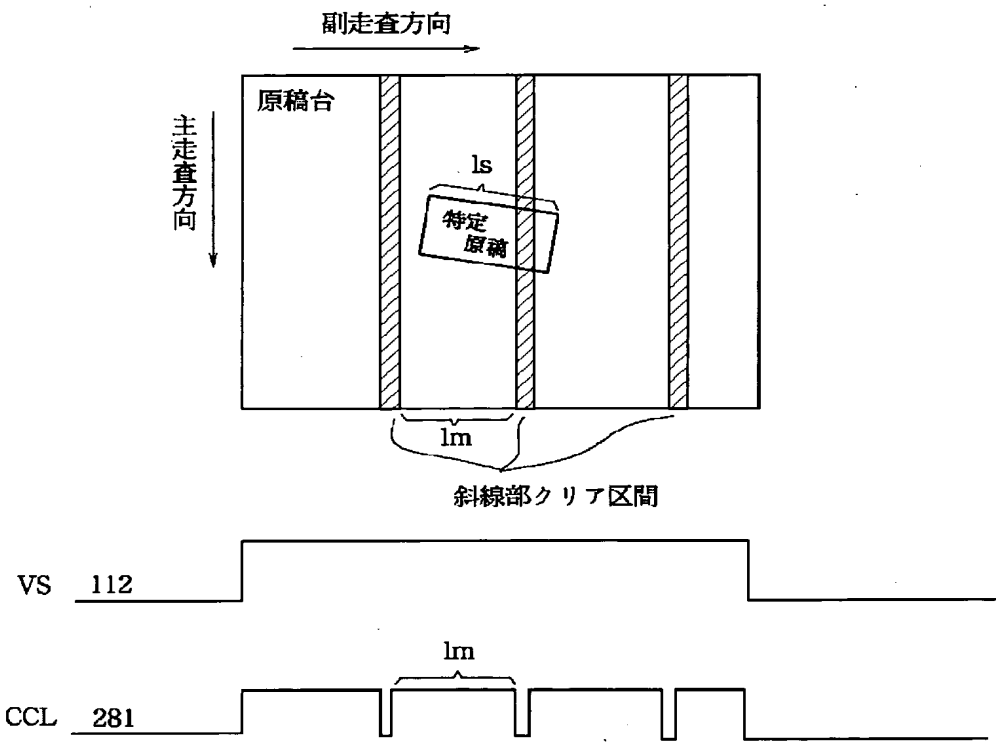



A′：入力原稿のうち
特定原稿Ⓐの部分の色味に似た部分

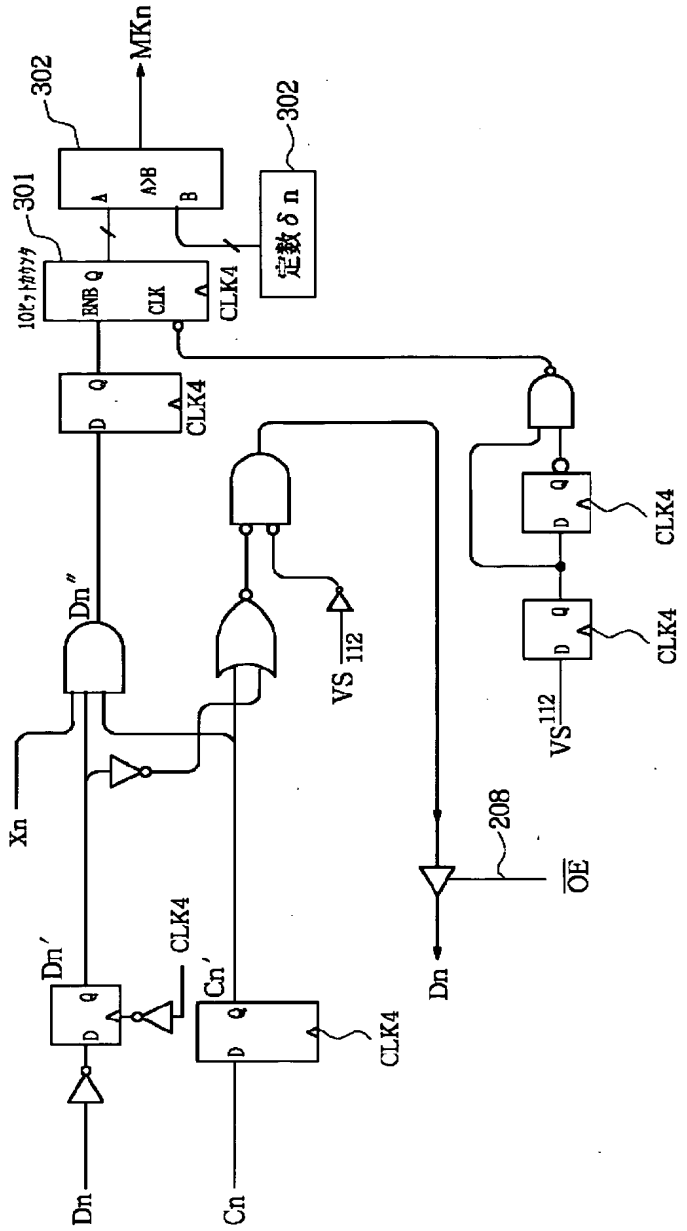
B′：入力原稿のうち
特定原稿のⒷの部分の色味に似た部分

C′：入力原稿のうち
特定原稿のⒸの部分の色味に似た部分

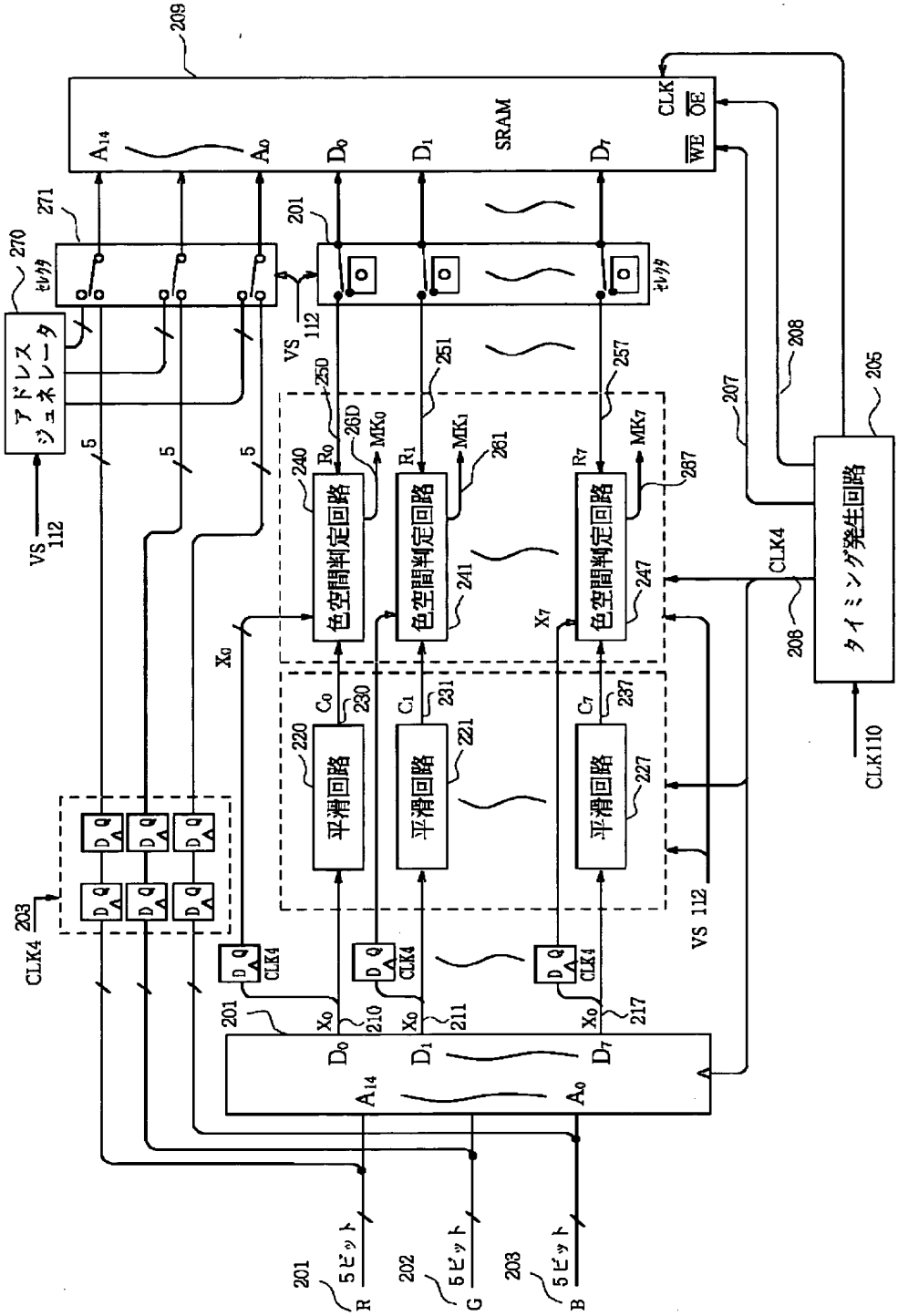
【図１５】



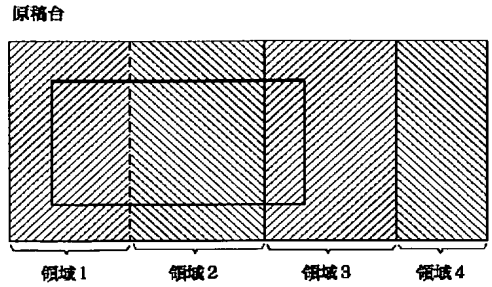
【図１６】


MKn
302
302
301
A
A>B
B
定数δn
CLK4
CLK
Q
D
CLK4
CLK4
CLK4
CLK4
Dn″
VS 112
VS 112
Xn
208
OE
Dn′
CLK4
Cn′
CLK4
Dn
Dn
Cn

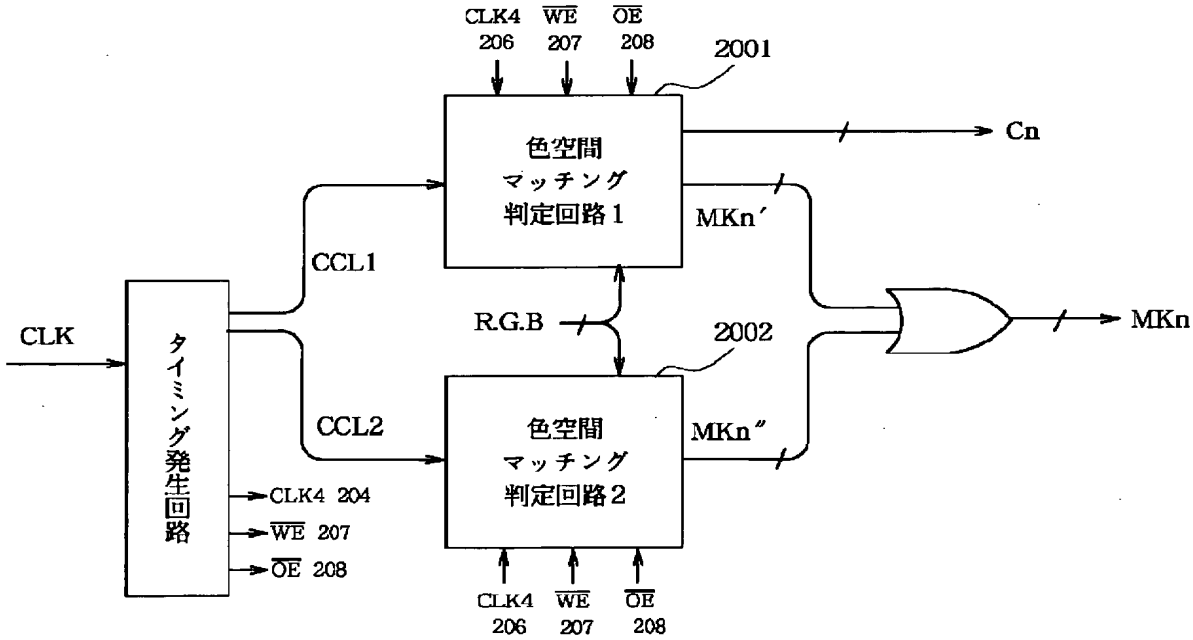
【図１７】


209
SRAM
CLK
WE
OE
A14
A0
D0
D1
D7
271
270
セレクタ
201
アドレス ジェネレータ
VS 112
5
250
251
257
240
241
247
色空間判定回路
R0
R1
R7
MK0
MK1
MK7
261
287
X0
X7
220
221
227
230
231
237
C0
C1
C7
平滑回路
D Q
CLK4
203
210
211
217
207
208
205
タイミング発生回路
CLK110
5ビット
R
G
B
202

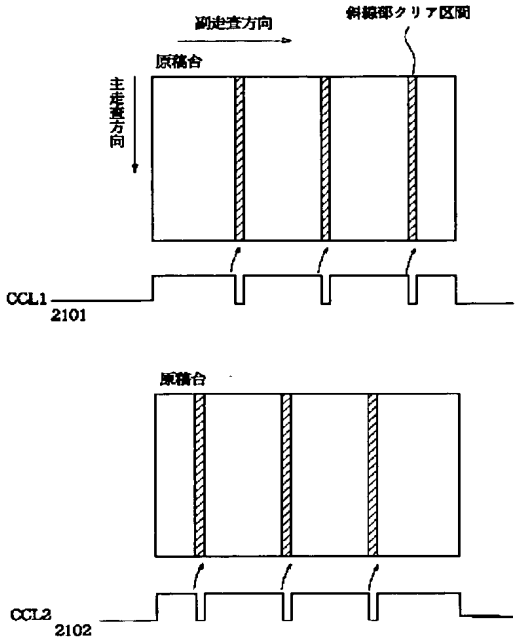
【図１９】


原稿台
領域1
領域2
領域3
領域4

【図２０】


CLK4 206
WE 207
OE 208
2001
色空間
マッチング
判定回路1
Cn
MKn′
CCL1
CLK
タイミング発生回路
R.G.B
2002
MKn
CCL2
色空間
マッチング
判定回路2
MKn″
CLK4 204
WE 207
OE 208
CLK4 206
WE 207
OE 208

【図２１】

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フロントページの続き

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CLAIMS

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[Claim(s)]
[Claim 1] The image processing system which is an image processing system which has a means to judge the similarity of an input image and a specific image, and is characterized by judging similarity with a specific image for every predetermined field of said input image.
[Claim 2] Said judgment means is an image processing system according to claim 1 characterized by judging similarity according to distribution of the tint of an input image and a specific image.
[Claim 3] Said specific image is an image processing system according to claim 1 characterized by being two or more images.

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[Translation done.]

* NOTICES *



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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the image processing system which performs detection of a specific image based on an input picture signal.
[0002]
[Description of the Prior Art] In recent years, the repeatability of the read manuscript is improving with development of a copying machine. For this reason, the technique for preventing forged acts, such as a bill, is needed. As one of the technique of the, the specific manuscript data in a color space are registered beforehand, distribution of input subject-copy image data judges whether it becomes almost the same as that of distribution of specific manuscript data on a color space, and the technique which distinguishes a specific manuscript is proposed by these people.
[0003] When it becomes more than the constant value which compares distribution in R (red) of input subject-copy image data, G (Green), R of B (blue) signal, G, and B three-dimension coordinate space with distribution in R of specific manuscript data, G, and B three-dimension coordinate space, and has the part which has agreed in more detail, it is judged that the image data of a specific manuscript is inputted.
[0004]
[Problem(s) to be Solved by the Invention] However, according to the above-mentioned technique, as shown, for example in drawing 18 , the area of an input manuscript is large, and when the parts similar to the tint of a specific manuscript are scattered, there is a problem of carrying out the misjudgment law of the input manuscript to a specific manuscript accidentally.

[0005] This becomes remarkable as the area of the input manuscript used as the object for a judgment becomes large relatively to a specific manuscript.
[0006] Then, this invention aims at offering the image processing system which prevented the incorrect judging by performing the above-mentioned judgment for every predetermined field of an input image.
[0007]
[Means for Solving the Problem and its Function] In order to solve the above-mentioned technical problem, the image processing system of this invention is an image processing system which has a means to judge the similarity of an input image and a specific image, and is characterized by judging similarity with a specific image for every predetermined field of said input image.
[0008]
[Example] Hereafter, an example explains the example of this invention.
[0009] (Signal-processing block diagram) Drawing 1 is the signal-processing block diagram of a color picture reader.
[0010] In this drawing, 101 is a CCD color sensor, 102 is an analog amplifier, 103 is an A/D converter and 104 is a shading compensation circuit by the reading location of a picture signal which amends dispersion in brightness.
[0011] 106 is a color space matching judging circuit which computes the similarity of distribution in the three-dimension color space of reading image data and specific manuscripts, such as a bill and negotiable securities, on real time.
[0012] By using the color signal after a shading compensation, a similarity judging in a color space can be performed to accuracy irrespective of the location by the location of a manuscript on which distortion of brightness and a tint is amended and an input manuscript is put.
[0013] The shading compensation circuit 104 of a color picture reader is not explained in full detail here for a well-known technique.
[0014] 105 is a print signal generation circuit and is a circuit which changes the input color signals R (red), G (Green), and B (blue) into Y (yellow), M (MAZENDA), C (cyanogen), and Bk (black) signal. Moreover, a print signal is modulated with the real-time amendment signal f113.
[0015] 107 is a circuit which generates the real-time amendment signal f113.
[0016] 108 is a circuit block which generates the reading synchronizing signals IIS109, CLK110, and VS112. IIS109 is a horizontal-scanning

section signal, CLK110 is a pixel reading basic clock signal, and VS112 is a section signal which shows the direction service area of vertical scanning of manuscript reading.
[0017] (Color space matching judging circuit block 106) Drawing 2 is a drawing explaining the color space matching judging 106.
[0018] In this drawing, R201 is data of 5 bits of high orders of the 8 bits of the R (red) signals from the shoe DINGU amendment circuit 104. Similarly, G202 is 5-bit G (Green) signal, and B203 is 5-bit B (blue) signal.
[0019] 204 is ROM (read-only memory) in which the information about the tint of two or more kinds of specific manuscripts is stored. Said R and G, and B signal are inputted into the addresses A0-A14, and the judgment signal which shows whether Inputs R and G and B signal have agreed in each tint of two or more kinds of specific manuscripts is outputted to data D0-D7.
[0020] As shown in the data of ROM204 at drawing 9 , the information about the tint of a specific manuscript is stored, and when agreeing in the tint of a specific manuscript and 1 is not so, 0 is outputted to each of D0-D7. D0-D7 correspond to eight kinds of specific manuscripts from the 0th to the 7th.
[0021] Drawing 13 is drawing having shown the relation between the data about the tint of two or more manuscripts stored in ROM204, and the bit position of ROM24. Thereby, the judgment information about the tint of D0-Dseven to eight kinds of different specific manuscripts is outputted to juxtaposition to the inputted pixel data.
[0022] 220-227 are circuits which perform the smooth operation shown by drawing 7 and drawing 8 using the signal of the tint judging signals X0210-X7217.
[0023] Drawing 7 is the circuit block diagram showing the circuitry of smoothing circuits 220-227.
[0024] For 701 and 702, as for an adder and 704, in this drawing, a multiplier and 703 are [ a latch circuit and 705 ] comparators. The judgment which considered the continuity as shown in lower drawing 8 R> 8 with a weighted average with the input data based on multipliers 701 and 702 and an adder 703 and before data is attained.
[0025] Drawing 8 is drawing showing relation with the smooth operation value Yi with Input Xi. If 1 continues [ the value of Input Xi ], the value of Yi will increase.
[0026] A more exact judgment is attained without setting signals 230-237 to 1, and being influenced of a noise etc. by this, when Inputs R and

G and B signal have agreed in the tint of a specific manuscript continuously.
[0027] In the color space judging circuits 240-247, the similarity of the specific image data in R and G which are shown in drawing 14 , and B color space, and an input color signal is computed on real time, and the color space similarity judging signals MK0260-MK7267 are computed.
[0028] Drawing 3 is one circuit block diagram among the color space judging circuits 240-247.
[0029] An OR operation is carried out to the data Dn from SRAM209, and the signal Cn from a smoothing circuit by this circuitry, and it is written in SRAM209. Moreover, only when Data Dn **** to 0 to 1, a counter 301 counts up. A counter 301 is cleared in the standup of the vertical-scanning section signal VS 112, or the low section of CCL281.
[0030] The circuit block 310 is a circuit which latches the maximum of the output value of a counter 301.
[0031] A size comparison is carried out with a comparator 302, and in Zn>delta n, the output maximum Zn of a counter 301 and constant deltan of a register 302 are set to MKn=1, and, in Zn<=delta n, are set to MKn=0. As for the value of deltan, l% of value of UORG of drawing 14 is set up.
[0032]
[External Character 1]

$$\delta n = \frac{l}{100} \times U_{ORG} \qquad \cdots (1)$$

Here, UORG is a numeric value which classified R, G, and B axis of coordinates 32 times in drawing 14 and which makes a cube unit volume.

[0033] When the specific manuscript is put on the manuscript base and it reads to abbreviation one half, the value of l is set up so that the judgment signal MKn may be set to 1.
[0034] CCL281 is a signal which shows the field which performs color space matching processing, is the timing shown in drawing 15 , and it is generated by the timing generating circuit 205 so that following the (2) type may be satisfied.
[0035]
[External Character 2]

$$ls \geqq lm \geqq \frac{ls}{2} \qquad \cdots (2)$$

ls: The block distance whose size lm:CCL281 of the longitudinal direction

of a specific manuscript is 1 [0036] Selectors 271 and 272 are for clearing SRAM209 to 0, when the vertical-scanning section signal VS 112 is 0 (LOW), or when the color space matching processing field signal 281 is 0 (LOW). An address generator 270 is a circuit which generates all the addresses of SRAM209 one by one. When VSCL280 is LOW, SRAM209 is cleared by 0 according to the address signal which an address generator 270 generates.
[0037] 205 is a timing generating circuit which is shown in drawing 4 and which generates a timing signal.
[0038] CLK4 206 is the clock signal which carried out 4 dividing of the basic clock CLK110, 207 is a signal which controls the write enable terminal of SRAM209, and 208 is a signal which controls the output enable terminal of SRAM209.
[0039] When the observation image data of a fixed section field, i.e., the data of the input color signal train in a fixed section field, becomes the image data of a specific manuscript, and the configuration almost same in R, G, and B three-dimension color space by the above-mentioned processing, the color space similarity judging signals MK0260-MK7267 are set as 1.
[0040] (Real-time amendment signal generation) Drawing 5 is a circuit block diagram explaining the real-time amendment signal generation circuit 107.
[0041] When judged with at least one of two or more specific manuscript data registered into ROM204 having agreed on observation image data and a color space by this circuitry, the real-time amendment signal f113 is set as 1 (HIGH).
[0042] (Print signal generation circuit) Drawing 6 is a circuit block diagram explaining the print signal generation circuit 105.
[0043] The masking UCR arithmetic circuit A601 is a circuit which generates a print YMCBk signal from an input RGB code at the time of usual.
[0044] The masking UCR arithmetic circuit B602 is a circuit which changed the tint and which generates a print (it is about redness) YMCBk signal, when judged with an input color signal agreeing in a specific manuscript.
[0045] It enables only the field judged that has agreed in the specific manuscript to change and print a tint by choosing and outputting the signal of circuits 601 and 602 with the real-time amendment signal f113 by the selector 603.
[0046] (Other examples) Drawing 20 and drawing 21 are the drawings for

explaining the 2nd example of this invention.
[0047] Said 1st example was what computes the similarity of color distribution of an input manuscript and a specific manuscript to every fixed section field. Since the calculation value of the similarity of color distribution is once cleared at fixed spacing (section of the slash of drawing 15 ), depending on the location on which the specific manuscript is put, specific manuscript detection may not go well.
[0048] In the example of **** 2, as formed the two judgment circuit sections 2001 and 2002 of the same configuration as **** and shown in drawing 2121 , with the signals 2101 (CCL1) and 2102 (CCL2) with which phases differ, it is each judgment circuit and specific manuscript detection is performed more to accuracy irrespective of the location on the manuscript base of a specific manuscript by performing a color space matching judging.
[0049] Since two or more circuits are used with a different phase according to this example, an exact judgment is attained by the easy signal control.
[0050] In addition, in the above-mentioned example, judgment data were reset so that field division might be performed in the direction of vertical scanning, but in judging with the software of a computer, field division may be performed to a main scanning direction, and it does not restrict the approach of division of a field to an above-mentioned example, for example.
[0051]
[Effect of the Invention] It becomes possible more to detect a specific image to accuracy by [ which were explained above / into which the input image was classified like ] judging similarity with a specific image for every field.

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[Translation done.]

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## TECHNICAL FIELD

---

[Industrial Application] This invention relates to the image processing system which performs detection of a specific image based on an input picture signal.

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PRIOR ART

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[0003] When it becomes more than the constant value which compares distribution in R (red) of input subject-copy image data, G (Green), R of B (blue) signal, G, and B three-dimension coordinate space with distribution in R of specific manuscript data, G, and B three-dimension coordinate space, and has the part which has agreed in more detail, it is judged that the image data of a specific manuscript is inputted.

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## EFFECT OF THE INVENTION

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[Effect of the Invention] It becomes possible more to detect a specific image to accuracy by [ which were explained above / into which the input image was classified like ] judging similarity with a specific image for every field.

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## TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] However, according to the above-mentioned technique, as shown, for example in drawing 18 , the area of an input manuscript is large, and when the parts similar to the tint of a specific manuscript are scattered, there is a problem of carrying out the misjudgment law of the input manuscript to a specific manuscript accidentally.
[0005] This becomes remarkable as the area of the input manuscript used as the object for a judgment becomes large relatively to a specific manuscript.
[0006] Then, this invention aims at offering the image processing system which prevented the incorrect judging by performing the above-mentioned judgment for every predetermined field of an input image.

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## OPERATION

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[Means for Solving the Problem and its Function] In order to solve the above-mentioned technical problem, the image processing system of this invention is an image processing system which has a means to judge the similarity of an input image and a specific image, and is characterized by judging similarity with a specific image for every predetermined field of said input image.

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EXAMPLE

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[Example] Hereafter, an example explains the example of this invention.
[0009] (Signal-processing block diagram) Drawing 1 is the signal-processing block diagram of a color picture reader.
[0010] In this drawing, 101 is a CCD color sensor, 102 is an analog amplifier, 103 is an A/D converter and 104 is a shading compensation circuit by the reading location of a picture signal which amends dispersion in brightness.
[0011] 106 is a color space matching judging circuit which computes the similarity of distribution in the three-dimension color space of reading image data and specific manuscripts, such as a bill and negotiable securities, on real time.
[0012] By using the color signal after a shading compensation, a similarity judging in a color space can be performed to accuracy irrespective of the location by the location of a manuscript on which distortion of brightness and a tint is amended and an input manuscript is put.
[0013] The shading compensation circuit 104 of a color picture reader is not explained in full detail here for a well-known technique.
[0014] 105 is a print signal generation circuit and is a circuit which changes the input color signals R (red), G (Green), and B (blue) into Y (yellow), M (MAZENDA), C (cyanogen), and Bk (black) signal. Moreover, a print signal is modulated with the real-time amendment signal f113.
[0015] 107 is a circuit which generates the real-time amendment signal f113.
[0016] 108 is a circuit block which generates the reading synchronizing signals IIS109, CLK110, and VS112. IIS109 is a horizontal-scanning section signal, CLK110 is a pixel reading basic clock signal, and VS112 is a section signal which shows the direction service area of vertical

scanning of manuscript reading.
[0017] (Color space matching judging circuit block 106) Drawing 2 is a drawing explaining the color space matching judging 106.
[0018] In this drawing, R201 is data of 5 bits of high orders of the 8 bits of the R (red) signals from the shoe DINGU amendment circuit 104. Similarly, G202 is 5-bit G (Green) signal, and B203 is 5-bit B (blue) signal.
[0019] 204 is ROM (read-only memory) in which the information about the tint of two or more kinds of specific manuscripts is stored. Said R and G, and B signal are inputted into the addresses A0-A14, and the judgment signal which shows whether Inputs R and G and B signal have agreed in each tint of two or more kinds of specific manuscripts is outputted to data D0-D7.
[0020] As shown in the data of ROM204 at drawing 9 , the information about the tint of a specific manuscript is stored, and when agreeing in the tint of a specific manuscript and 1 is not so, 0 is outputted to each of D0-D7. D0-D7 correspond to eight kinds of specific manuscripts from the 0th to the 7th.
[0021] Drawing 13 is drawing having shown the relation between the data about the tint of two or more manuscripts stored in ROM204, and the bit position of ROM24. Thereby, the judgment information about the tint of D0-Dseven to eight kinds of different specific manuscripts is outputted to juxtaposition to the inputted pixel data.
[0022] 220-227 are circuits which perform the smooth operation shown by drawing 7 and drawing 8 using the signal of the tint judging signals X0210-X7217.
[0023] Drawing 7 is the circuit block diagram showing the circuitry of smoothing circuits 220-227.
[0024] For 701 and 702, as for an adder and 704, in this drawing, a multiplier and 703 are [ a latch circuit and 705 ] comparators. The judgment which considered the continuity as shown in lower drawing 8 R> 8 with a weighted average with the input data based on multipliers 701 and 702 and an adder 703 and before data is attained.
[0025] Drawing 8 is drawing showing relation with the smooth operation value Yi with Input Xi. If 1 continues [ the value of Input Xi ], the value of Yi will increase.
[0026] A more exact judgment is attained without setting signals 230-237 to 1, and being influenced of a noise etc. by this, when Inputs R and G and B signal have agreed in the tint of a specific manuscript continuously.

[0027] In the color space judging circuits 240-247, the similarity of the specific image data in R and G which are shown in drawing 14 , and B color space, and an input color signal is computed on real time, and the color space similarity judging signals MK0260-MK7267 are computed.
[0028] Drawing 3 is one circuit block diagram among the color space judging circuits 240-247.
[0029] An OR operation is carried out to the data Dn from SRAM209, and the signal Cn from a smoothing circuit by this circuitry, and it is written in SRAM209. Moreover, only when Data Dn **** to 0 to 1, a counter 301 counts up. A counter 301 is cleared in the standup of the vertical-scanning section signal VS 112, or the low section of CCL281.
[0030] The circuit block 310 is a circuit which latches the maximum of the output value of a counter 301.
[0031] A size comparison is carried out with a comparator 302, and in Zn>delta n, the output maximum Zn of a counter 301 and constant deltan of a register 302 are set to MKn=1, and, in Zn<=delta n, are set to MKn=0. As for the value of deltan, l% of value of UORG of drawing 14 is set up.
[0032]
[External Character 1]

$$\delta n = \frac{1}{100} \times U_{ORG} \qquad \cdots (1)$$

Here, UORG is a numeric value which classified R, G, and B axis of coordinates 32 times in drawing 14 and which makes a cube unit volume.

[0033] When the specific manuscript is put on the manuscript base and it reads to abbreviation one half, the value of l is set up so that the judgment signal MKn may be set to 1.
[0034] CCL281 is a signal which shows the field which performs color space matching processing, is the timing shown in drawing 15 , and it is generated by the timing generating circuit 205 so that following the (2) type may be satisfied.
[0035]
[External Character 2]

$$ls \geqq lm \geqq \frac{ls}{2} \qquad \cdots (2)$$

ls: The block distance whose size lm:CCL281 of the longitudinal direction of a specific manuscript is 1 [0036] Selectors 271 and 272 are for clearing SRAM209 to 0, when the vertical-scanning section signal VS

112 is 0 (LOW), or when the color space matching processing field signal 281 is 0 (LOW). An address generator 270 is a circuit which generates all the addresses of SRAM209 one by one. When VSCL280 is LOW, SRAM209 is cleared by 0 according to the address signal which an address generator 270 generates.

[0037] 205 is a timing generating circuit which is shown in drawing 4 and which generates a timing signal.

[0038] CLK4 206 is the clock signal which carried out 4 dividing of the basic clock CLK110, 207 is a signal which controls the write enable terminal of SRAM209, and 208 is a signal which controls the output enable terminal of SRAM209.

[0039] When the observation image data of a fixed section field, i.e., the data of the input color signal train in a fixed section field, becomes the image data of a specific manuscript, and the configuration almost same in R, G, and B three-dimension color space by the above-mentioned processing, the color space similarity judging signals MK0260-MK7267 are set as 1.

[0040] (Real-time amendment signal generation) Drawing 5 is a circuit block diagram explaining the real-time amendment signal generation circuit 107.

[0041] When judged with at least one of two or more specific manuscript data registered into ROM204 having agreed on observation image data and a color space by this circuitry, the real-time amendment signal f113 is set as 1 (HIGH).

[0042] (Print signal generation circuit) Drawing 6 is a circuit block diagram explaining the print signal generation circuit 105.

[0043] The masking UCR arithmetic circuit A601 is a circuit which generates a print YMCBk signal from an input RGB code at the time of usual.

[0044] The masking UCR arithmetic circuit B602 is a circuit which changed the tint and which generates a print (it is about redness) YMCBk signal, when judged with an input color signal agreeing in a specific manuscript.

[0045] It enables only the field judged that has agreed in the specific manuscript to change and print a tint by choosing and outputting the signal of circuits 601 and 602 with the real-time amendment signal f113 by the selector 603.

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]
[Drawing 1] The signal-processing block diagram of a color picture reader.
[Drawing 2] The drawing explaining the color space matching judging 106.

[Drawing 3] The drawing explaining the color space judging circuits 240-247.
[Drawing 4] The timing chart about data reading by SRAM209, and writing.
[Drawing 5] The circuit block diagram explaining the real-time amendment signal generation circuit 107.
[Drawing 6] The circuit block diagram explaining the print signal generation circuit 105.
[Drawing 7] The block diagram showing the circuitry of smoothing circuits 220-227.
[Drawing 8] Drawing showing the relation between Input Xi and the smooth operation value Yi.
[Drawing 9] Drawing having shown the configuration in the color space of a specific manuscript, and the relation of judgment ROM 204.
[Drawing 10] Drawing having shown the location of the specific manuscript on a manuscript base, and the relation of a recognition field.
[Drawing 11] Drawing having shown distribution in R of the specific manuscript A, G, and B three-dimension color space.
[Drawing 12] Drawing having shown distribution in R of the specific manuscript B, G, and B three-dimension color space.
[Drawing 13] Drawing explaining the data configuration of ROM204 in which the tint information on specific manuscript A-H was stored.
[Drawing 14] Drawing having shown notionally the comparison with

specific image data and input image data.
[Drawing 15] Drawing having shown the relation between the color space matching processing field signal CCL 281 and the field where it was classified on the manuscript base.
[Drawing 16] Drawing explaining the color space judging circuits 240-247.
[Drawing 17] Drawing explaining the color space matching judging 106.
[Drawing 18] Drawing having shown color distribution of an input manuscript.
[Drawing 19] Drawing having shown the input area classified in the 1st example.
[Drawing 20] Drawing explaining the color space matching judging 106 of the 2nd example.
[Drawing 21] Drawing explaining the field in the 2nd example classified.
[Description of Notations]
106 Color Space Matching Judging Circuit
107 Real-time Amendment Signal Generation Circuit

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